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Waters Acquity UPLC Column Manager Specifications

Acquity UPLC System With Column Manager

The Waters® ACQUITY UPLC® with Column Manager System provides an integrated configuration for solvent and XYZZ sample management designed for use with ACQUITY UPLC chemistries. This ACQUITY UPLC System is comprised of a Binary Solvent Manager, a Sample Manager with a Column Manager, and a Solvents Tray. The optional Sample Organizer is available for expanded sample capacity. The full line of Waters MS Technologies products, from single quadrupole to hybrid quadrupole time-of-flight (Q-ToF™), are also available.

Column Manager Performance Specifications

Item	Specification
Columns Capacity	CM-A: Two columns, as standard (maximum length of 150 mm with filter or guard column) or four columns (maximum length of 50 mm) can be supported with optional tubing kit, up to 4.6 mm internal diameter (ID)
Switching Valves	Two injector-style, nine-port, eight-position valves (CM-A only); provides programmable, automatic, random access switching, waste and bypass positions for rapid solvent changeover
Column Compartment(s) temperature range	4.0 to 90.0 °C, settable in 0.1 °C increments; two independent heat/cool zones.
Column Compartment(s) temperature accuracy	±0.5 °C
Column Compartment(s) temperature stability	±0.3 °C
Solvent Conditioning	Active pre-heating as standard

Column Tracking	eCord™ Technology column information management tracks and archives column usage history
Unattended operation	Leak sensors, full 96-hour diagnostic data displayed through Acquity UPLC console software

Physical Specifications

Attribute	Specification
Height	19.9 cm (7.8 inches)
Width	34.3 cm (13.5 inches)
Depth	61.0 cm (24.0 inches)
Weight	20.9 kg (46.0)

Electrical Specifications

Attribute	Specification
Protection class*	Class I
Overvoltage category**	II
Pollution degree***	2
Moisture protection****	Normal (IPXO)
!Line Voltages, nominal	Grounded AC
Voltage range	100 to 240 Vac
Frequency	50/60 Hz
Maximum power draw	400 VA

*Protection Class I-The insulating scheme used in the instrument to protect from electrical shock. Class I identifies a single level of insulation between live parts (wires) and exposed conductive parts (metal panels), in which the exposed conductive parts are connected to a grounding system. In turn, this grounding system is connected to the third pin (ground pin on the electrical power cord plug).

**Overvoltage category II-Pertains to instruments that receive their electrical power from a local level such as an electrical wall outlet.

***Pollution Degree 2-A measure of pollution on electrical circuits that can produce a reduction of dielectric strength or surface resistivity. Degree 2 refers only to normally nonconductive pollution. Occasionally, however, expect a temporary conductivity caused by condensation.

***Moisture Protection-Normal (IPXO)- IPXO means that no Ingress Protection against any type of dripping or sprayed water exists. The "X" is a placeholder that identifies protection against dust, if applicable.

Two-Column Configuration Plumbing Connection Details

From	To	Length (")	Part Number	Order Part #
CM-A inlet valve, port B	CM-A outlet valve, port B	N/A	430002725, bypass tubing, .004" ID	
CM-A inlet valve, port W*	Solvent Manager front drip tray waste port	N/A	430002727, waste tubing, .004" ID	
CM-A inlet valve, port 3	Column 1 inlet	12.5	205000730, APH	
CM-A inlet valve, port, 4	Column 2 inlet	12.5	205000730, APH	
Column 1 outlet	CM-A outlet valve, port 3	19	430002683, stainless stell (SST) tubing, .004" ID	700005478
Column 1 outlet	CM-A outlet valve, port 4	19	430002683, SST tubing, .004" ID	700005478
Sample Manager Injector Valve, Port 6	CM-A inlet valve, center port	14.5	430002582, SST tubing, .004" ID	700005476
Sample Manager Injector Valve, Port 6	CM-A inlet valve, center port	19**	430002599, tube assembly, .004" ID	700005476
Online SPE Manager inlet solvent select (ISS) valve, port 6	CM-A inlet valve, center port	27	430002739, SST Tubing, .004" ID	
Detector Inlet	CM-A outlet valve, center port	14.5	430002681, SST Tubing, .004" ID	700005477
		19	430002683, SST Tubing, .004" ID	700005478
		22.5	430002657, SST Tubing, .004" ID	700005480
MS Diverter Valve, Center Port	CM-A outlet valve, center port	24	430002651, black PEEK, .004" ID	

*Be sure to connect the 430002727 waste tubing to port W (at the 3 O'clock position) of the inlet valve. Do not connect to the center port.

**Depending on your configuration, it may be necessary to order extra lengths of this tubing.

Four-column configuration plumbing connection details

From	To	Length (")	Part #	Order part #
CM-A inlet valve, port B	CM-A outlet valve, port B	N/A	430002725 bypass tubing, .004" ID	
CM-A inlet valve, port W*	Outlet is system specific	N/A	430002727 waste tubing, .005" ID	
CM-A inlet valve, port 3	Column 2 inlet	18.5	205000774, APH	
CM-A inlet valve, port 4	Column 4 inlet	18.5	205000774, APH	
CM-A inlet valve, port 5	Column 1 inlet	12.5	205000730, APH	
CM-A inlet valve, port 6	Column 3 inlet	12.5	205000730, APH	
Column 2 outlet	CM-A outlet valve, port 3	14.5	430002681, SST tubing, .004" ID	700005477
Column 4 outlet	CM-A outlet valve, port 4	19	430002683, SST tubing, .004" ID	700005478
Column 1 outlet	CM-A outlet valve, port 5	14.5	430002681, SST tubing, .004" ID	700005477
Column 3 outlet	CM-A outlet valve, port 6	19	430002683, SST tubing, .004" ID	700005478
For the sample manager injector valve, port 6; for the online SPE manager ISS valve, port 6. Tubing is system specific.	CM-A inlet valve, center port	14.5	430002582, SST tubing, .004" ID	700005476
Sample manager injector valve, port 6	CM-A inlet valve, center port	19**	430002739, SST tubing .004" ID	700005479
Online SPE manager ISS valve, port 6	CM-A inlet valve, center port	27	430002739, SST tubing, .004" ID	
Detector inlet	CM-A outlet valve, center port	14.5	430002681, SST tubing, .004" ID	700005477
		19	430002683, SST tubing, .004" ID	700005478
		22.5	43002657, SST tubing, .004" ID	700005480
MS diverter valve, center port	CM-A outlet valve, center port	24	430002651, black PEEK, .004" ID	

*Be sure to connect the 430002727 waste tubing to port W (at the 3 O'clock position) of the inlet valve. Do not connect to the center port.

**Depending on your configuration, it may be necessary to order extra lengths of this tubing.

Acquity UPLC Binary Solvent Manager

Number of solvents: Up to four in any combination of two: A1 or A2 and B1 or B2

Solvent storage: Solvents Tray accommodates up to four chromatographic solvents, plus two Sample Manager wash solvents and one Binary Solvent Manager seal wash solvent

Solvent conditioning: Vacuum degassing (six-channel): one channel per solvent and two channels for Sample Manager seal wash solvents

Operating flow range: 0.010 to 2.000 mL/min, in 0.001 mL increments

Compressibility compensation: Automatic and continuous

Effective system delay volume: < 120 µL, independent of system backpressure (with standard 50-µL mixer installed)

Plunger seal wash: Integral, active, programmable

Gradient profiles: Eleven gradient curves [including linear, step (2), concave (4), and convex (4)]

Wet prime: Automatic

Maximum operating pressure: 15,000 psi up to 1 mL/min, 9,000 psi up to 2 mL/min per pump, not more than 15,000 psi total

Composition accuracy: ±0.5% absolute (full scale) from 5% to 95% of flow rates from 0.5 to 2.0 mL/min

Composition precision: 0.15% RSD or ±0.04 min. SD, whichever is greater, based on retention time

Flow precision: 0.075% RSD or ±0.02 min. SD, six replicates, based on retention time

or volumetric measures (0.5 to 2.0 mL/min)

Flow accuracy: ±1.0% at 0.5 mL/min with degassed methanol, per Waters' AQT/SystemsQT protocol

Primary wetted materials: 316 stainless steel, UHMWPE, sapphire, ruby, FEP, PTFE, ETFE, diamond-like coating, PEEK and PEEK alloys, titanium alloys

Acquity UPLC Sample Manager

Number of sample plates: Total of two plates, expandable to up to 22 plates with optional Sample Organizer (see below):

- 96 and 384 microtiter plates
- 48 position 2.00-mL vial plates
- 48 position 0.65-mL micro-centrifuge tube plates
- 24 position 1.50-mL micro-centrifuge tube plates

Maximum sample capacity: 768 in two 384-well plates; expandable to up to 8,448 samples with optional Sample Organizer (see below)

Number of sample injections: 1 to 99 injections per sample

Injection volume range: 0.1 to 50.0 µL, in 0.1 µL increments, partial or full loop mode, 10-µL loop is standard; 1, 2, 5, 20, and 50-µL loops also available

Sample delivery precision: < 0.3% RSD, full loop, standard 10-µL loop, (default wash/purge conditions), (full loop injection mode) per Waters' AQT/SystemsQT protocol

Injector linearity: > 0.999 coefficient of deviation from 20% to 75%, partial loop overfill mode (PLNO injection mode), per Waters' AQT/SystemsQT protocol

Sample delivery precision: < 1% RSD within 20% to 75% of loop volume for (PLNO injection mode) 1, 2, 5, 10, 20, and 50-µL loops, UV detection

Sample temperature control: 4 to 40 °C, settable in 0.1 °C increments

Injection cycle time: < 15 sec between multiple injections with "load ahead" enabled 30 sec with single weak wash, 10-µL loop, pressure assist mode

Sample probe: XYZZ based needle-in-needle design

Minimum sample required: 5 µL residual, using maximum recovery 2-mL vials (zero offset)

Wash solvents: Two degassed: strong solvent and weak wash solvent, programmable to suit application

Sample carryover: < 0.005% or < 2.0 nL, whichever is greater

Advanced operation Loop: off-line mode, load ahead

Unattended operation: Leak sensors, full diagnostic data captured through console software

Primary wetted materials: Titanium alloy, 316 stainless steel, fluoropolymer, fluoroelastomer, PPS alloy, PEEK alloy, PPS, PEEK, DLC coating, gold

Acquity UPLC Column Compartment

Switching valves: Two injector-style, seven-port, six-position, switching valves, left and right, provide programmable automatic random access switching among up to four columns, waste and bypass positions

Column compartment: Accommodates up to four columns; in parallel Column sizes 20 to 150 mm length x 2.1 to 4.6 mm internal diameter (I.D.), plus either a guard column or an in-line filter (30 mm max.)

Column temperature control: 10.0 to 90.0 °C settable in 0.1 °C increments

Column tracking: eCord™ Technology column information management tracks and archives usage history of each of up to four columns

Compartment operational temperature range: 15 °C below ambient to 90 °C: to a minimum of 10 °C

Compartment temperature ±1.0 °C measurement accuracy

Note: temperature is measured by an NIST traceable probe located next to the measurement sensor will be within the specification.

Compartment heating rate Heating time is:

- Less than 10 min from 10 to 30 °C or from 30 to 50 °C
- Less than 30 min from 30 to 80 °C

Compartment cooling rate Temperature cool-down time:

- Less than 30 min from 80 to 30 °C
- Less than 10 min from 50 to 30 °C or from 30 to 10 °C

Advanced operations: Switch columns with divert flow to waste for rapid solvent changeover or bypass to detector

Acquity UPLC Instrumental Control

External communication: Ethernet interfacing via RJ45 connection to host PC

Event inputs/outputs: Rear panel contact closure and/or TTL inputs/outputs

External control: Empower™ 1154 or 2154; or MassLynx™ or Empower network or standalone through console software

User diagnostics: Available through software on host PC; system control via console software

Connections INSIGHT® Provides real-time monitoring and automatic notification of instrument performance and diagnostic information allowing for quicker problem resolution

ACQUITY UPLC Local Console Controller (LCC): This controller mounts to the Sample Manager and communicates directly with the ACQUITY UPLC Console software application. The LCC monitors system and module functions can set initial conditions and run selected diagnostics. The LCC cannot create or edit instrument methods or acquire data.

Environmental Specifications

Acoustic noise: < 65 dBA

Operating temperature range: 4.0 to 40.0 °C (39.2 to 104.0 °F)

Operating humidity range: 20% to 50%, non-condensing

Power Requirements

Voltage range: 90 to 264 VAC

Frequency: 47 to 63 Hz

Physical Dimensions

Core ACQUITY UPLC System: Binary Solvent Width: 34.3 cm (13.5 in.) Manager, Sample Manager with Column Height: 83.9 cm (33.1 in.) Manager, and Solvents Tray Depth: 71.1 cm (28.0 in.)

High Capacity ACQUITY UPLC System: Width: 58.4 cm (23.0 in.) Binary Solvent Manager, Sample Manager Height: 83.9 cm (33.1 in.) with Column Manager, Solvents Tray, Depth: 71.1 cm (28.0 in.) and Sample organizer

Acquity UPLC Sample Organizer (Optional)

Number of sample plates Total of up to:

- 22 standard microtiter plates
- 11 intermediate height plates (or 2-mL vial holders)
- Seven deep-well plates
- Combinations thereof

Maximum sample capacity: Total of up to 8,448 samples in 22 384-well plates, or 11 528 2-mL vials

Temperature control: 4 to 40 °C, settable in 1 °C increments

Plate exchange: < 15 seconds (retrieval and replace time)

Sample temperature control: At ambient temperature of 21 °C or lower, the sample organizer will maintain the

temperature of the sample compartment down to 4 °C with a tolerance of -2/+6 °C, when configured with the maximum number of vials and/or plates; for ambient temperatures above 21 °C, there is a delta of 17 °C from actual ambient temperature

Racks: 10 storage shelf assemblies supplied standard

Acquity UPLC Flex Cart (Optional)

Dimensions Width: 76.1 cm (30.0 in.) Depth: 83.8 cm (33.0 in.)

Minimum table height: 76.1 cm (30.0 in.)

Maximum table height: 111.8 cm (44.0 in.)

Height adjustment: 35.6 cm (14.0 in.)

Cart weight 77.3 kg (170.0 pounds)

Supportable weight: 181.8 kg (400.0 pounds)

Ordering Information Part Number

ACQUITY UPLC System with 176015001 Column Manager Right Inlet

ACQUITY UPLC System with 176015003 Column Manager Left Inlet

ACQUITY UPLC Sample Organizer 186015020

ACQUITY UPLC Sample Organizer shelf 700002730

ACQUITY UPLC FlexCart 205015015

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